

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for locating a dental target within a digital dental image, said method comprising ~~the steps of:~~
segmenting a digital dental image, including a reference object within ~~at~~ the digital dental image ~~to provide a segmented reference~~, said reference object having a predetermined size dimension;
comparing a color metric of digital dental image segments to a known color metric of the reference object to determine a location of the reference object within the digital dental image;
segmenting a window in said dental image; and
defining the size and location of said window relative to said ~~segmented~~ reference object prior to said segmenting of said window.
2. (Original) The method of claim 1 further comprising searching within said dental image from said reference object along a predetermined initializing vector to a start location, said window being inclusive of said start location.
3. (Original) The method of claim 1 wherein said segmenting of said window further comprises applying a predetermined active shape model to said dental image.
4. (Original) The method of claim 3 wherein said active shape model includes one or more shape parameters.
5. (Original) The method of claim 4 wherein said active shape model includes one or more texture parameters.

6. (Original) The method of claim 3 wherein said active shape model includes one or more texture parameters.

7. (Original) The method of claim 3 wherein said active shape model is inclusive of said reference object.

8. (Original) The method of claim 3 wherein said active shape model is exclusive of said reference object.

9. (Original) The method of claim 8 further comprising manually providing spatial coordinates of at least two nodes of said window to said active shape model.

10. (Original) The method of claim 1 wherein said segmenting of said window further comprises presenting a plurality of different predetermined active shape models and accepting user input selecting one said active shape models as a selected model, and applying said selected model to said dental image.

11. (Original) The method of claim 10 wherein said user input is a tooth designation.

12. (Original) The method of claim 1 further comprising:
displaying said dental image and said window following said segmenting of said window; and
accepting user adjustment of said window.

13. (Canceled)

14. (Currently Amended) ~~The method of claim 13~~ A method for locating a dental target within a digital dental image, said method comprising:
automatically segmenting a reference object within a digital dental image to provide a segmented reference, said reference object having a

predetermined size dimension, wherein said segmenting of said reference object ~~further comprises~~includes:

transforming said dental image from a red-green-blue color space to a hue-saturation-intensity color space.

detecting uniformly colored, spatially-contiguous regions of said dental image; and

determining if one of said regions has properties matching predetermined properties of said reference object;

segmenting a window in said dental image;

defining the size and location of said window relative to said segmented reference prior to said segmenting of said window.

15. (Original) The method of claim 14 wherein said segmenting further comprises, following said determining:

stopping said evaluating when said properties match;

cutting one or more of said regions into subregions when said properties of each of said regions and said predetermined properties of said reference object are mismatched; and

determining if one of said subregions has properties matching predetermined properties of said reference object.

16. (Original) The method of claim 1 further comprising:

placing said reference object in a patient's mouth, wherein said reference object defines said start location on said dental target; and

capturing an image of said reference object and said dental target;
and

digitizing said image to provide said dental image.

17. (Currently Amended) A computer program product for locating a dental target within a digital dental image, said product comprising: a computer readable storage medium having a computer program stored thereon for performing the steps of:

segmenting a reference object within a digital dental image to provide a segmented reference, said reference object having a predetermined size dimension, wherein said segmenting of said reference object includes:

transforming said dental image from a red-green-blue color space to a hue-saturation-intensity color space.

detecting uniformly colored, spatially-contiguous regions of said dental image; and

determining if one of said regions has properties matching predetermined properties of said reference object;

segmenting a window in said dental image;

defining the size and location of said window relative to said segmented reference prior to said segmenting of said window.

18. (Currently Amended) A dental shade matching system comprising:

a programmable computer having a microprocessor, computer memory, a computer program stored in said computer memory for performing the steps of:

segmenting a reference object within a digital dental image to provide a segmented reference, said reference object having a predetermined size dimension, wherein said segmenting of said reference object includes:

transforming said dental image from a red-green-blue color space to a hue-saturation-intensity color space.

detecting uniformly colored, spatially-contiguous regions of said dental image; and

determining if one of said regions has properties matching predetermined properties of said reference object;

segmenting a window in said dental image;

defining the size and location of said window relative to said segmented reference prior to said segmenting of said window, said computer having a memory interface operatively connected to said microprocessor;

a digital camera having memory operatively connectable to said memory interface; and
a bitable reference object.

19. (Currently Amended) ~~The system of claim 18~~A dental shade matching system comprising:

a programmable computer having a microprocessor, computer memory, a computer program stored in said computer memory for performing the steps of:

segmenting a reference object within a digital dental image to provide a segmented reference, said reference object having a predetermined size dimension, wherein said reference object has a rectangular front face, said front face having a size and shape identified in said program;

segmenting a window in said dental image; and

defining the size and location of said window relative to said segmented reference prior to said segmenting of said window,
said computer having a memory interface operatively connected to said microprocessor;

a digital camera having memory operatively connectable to said memory interface; and

a bitable reference object.

20. (Original) The system of claim 19 wherein said front face has a uniform tone-scale value.

21. (New) A method for locating a dental target in a digital dental image, the method comprising:

segmenting the digital dental image into a plurality of regions;

locating a reference object within the digital dental image by checking each of the plurality of regions for a predetermined image property of the reference object; and

positioning and sizing a window about the dental target with the digital dental image relative to the located reference object.

22. (New) The method of claim 21, wherein the predetermined image property comprises a tone scale value or a range of tone scale values.

23. (New) The method of claim 21, wherein the predetermined image property comprises Hue-Saturation-Intensity color metric obtained by converting an sRGB color metric of the digital dental image and the reference object to the Hue-Saturation-Intensity color metric.

24. (New) The method of claim 21, wherein positioning and sizing the window includes defining a locating feature on the reference object, wherein the locating feature has a predetermined positional relationship to the dental target.

25. (New) The method of claim 24, wherein a start point of the dental target is defined by an initializing vector from the locating feature of the reference object.